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كلية الطب والعلوم الصحية  
دفعة بصمة طبيب 31  
طب بشري

Lecture No. 22

# ophthalmology

## PREVENTIVE OPHTHALMOLOGY

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# Preventive Ophthalmology

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تقريباً أغلب الشرائح التي قرأهم الدكتور مكتوبه مع اضافة ملاحظات الدكتور بس في بعض النقاط القليله ماذكرهن ارجعوا للداتا شو^^

**\*Preventive medicine:-** It's a prevent to the occurrence of the disease.(يعتبر من ارقى انواع الطب)

**\*Curative medicine:-** patient who we can treat .

If we are going to speak about the preventive medicine in any part of the medicines or in any branch of the diseases we are going to speak on the 3 levels which are:-

1. **Primary level:-** primary health units.
2. **Secondary level:-** hospitals and clinics.
3. **Tertiary level:-** In teaching & research hospitals.
4. **Center of excellence:-** it's a branch of the tertiary level.

If we have any disease let say about the malaria we take data from the endemic area and then we estimate the prevalence, after that we made a strategy which will going to decrease the incidence of the disease and this will control the endemic diseases and prevent the new additional diseases.

-The National Program for Control of Blindness (NPCB) is responsible for preventive medicine

It start from the primary health unit in districts

**\*What's blindness? سؤال اختبار**

According to WHO the blindness is when the vision in the best corrected eye is 3/60 or less.

It means he count fingers in a distance of 3 meters or less.

-Normal vision is 6/18 and better

-Visual impairment from 6/24 to 6/60

-Severely impaired vision from 6/60 to 3/60 less than 3\60 is blindness.

**\*What's the goal of NPCB?**

The goal is to reduce the prevalence of blindness.

The objectives of NPCB are:-

1. **To reduce the backlog of blindness through identification and treatment of blind.** it mean that we must treat the patient before he become blind the best example is Cataract one of the curable blindness when we see him first in the primary health unit we referred him to the hospitals or clinics (2ry level) to do cataract surgery and he will cure from blindness.
2. **To develop eye care facilities in every district.** In every primary health care there must be a special facilities for detections of the blindness disease, most important diseases are (Glaucoma, Trachoma, Cataract, Vit A deficiency) this are the diseases that we can treat in districts , in the primary health unit but in the hospitals this mainly will do interference whatever the medical or surgical treatment is needed.
3. **To develop human resources for providing eye care services.** Nurse must has knowledge about preventive medicine from ophthalmic view, this nurse called preventive care ophthalmic assistant he must know how to do visual tests and how to investigate a case of glaucoma, Vit A deficiency and cataract. In the primary health unit there must be a doctor or doctor assistant.

4. To improve the quality of service delivery.
5. To secure participation of voluntary organizations in eye care. Get the orders from the 3<sup>rd</sup> level and it requires volunteers to applied the preventive medicine in the districts.

\*The aim of prevention of any disease is to reduce the prevalence of any disease in the community & to reduce the severity of contributing factors as protein energy malnutrition, diarrhea, measles, and respiratory infection. For example reducing the prevalence of the glaucoma from 4% to 1%.

This is important in the districts and there must be a general practitioner and assistants in the primary health unit because they will be the first who facing malnutrition, trachoma, cataract, trauma, vit A deficiency and they must be oriented about this diseases and to be able to give the treatment in the primary health unit without the needing to refer him to the 2ry level but some diseases should be referred to the 2ry or tertiary levels.

**\*What's the meaning of the prevalence of the disease? سؤال اختبار ممكن يجي فراغات باختبار الاوسكي او في النظري**

Is the number of cases of a disease in a specific place at a specific time.

- Preventive ophthalmology to decrease the incidence rate of the disease.

**\*What's the meaning of incidence of the disease?**

It's the number of new cases of a disease during a given period, per thousand of population. For example cases of trachoma about 30 per 1000 of population.

**\*Eye care infrastructure development:-**

We have human resources and drugs essential in primary eye unit.

The standard is to have both a doctor and a doctor assistant in the 1ry health unit but in Yemen we don't follow this standard -  
—

- a. Primary level :- in the districts and serve 50000 of population
- b. 2ry level:- hospitals or clinics serve 500000 of population
- c. Tertiary level:- Training centers serve 5 million of population.
- d. Center of the excellence (COE):- serve 20 million of population, there isn't COE in Yemen but we have tertiary level.

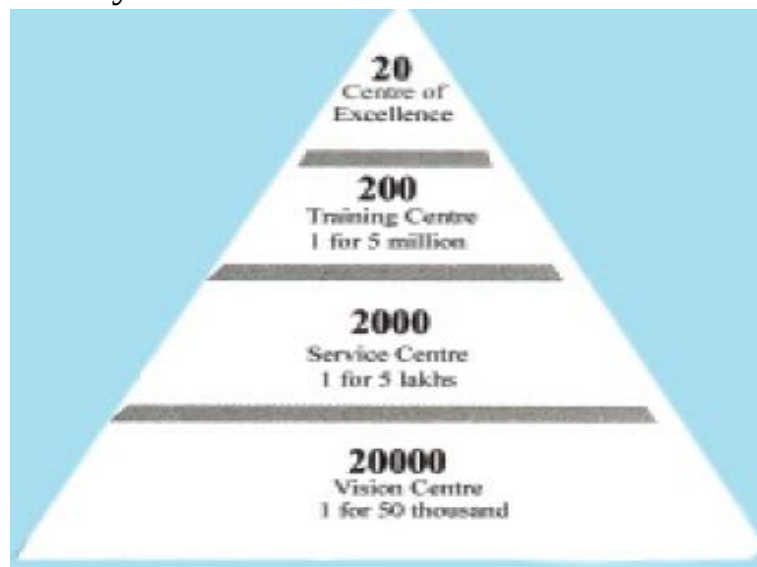


Fig. 20.1. The infrastructure pyramid, based on the recommendations of WHO.

### **Burden of blindness in Yemen:-**

An estimated around 1.5% of the population are blind in Yemen (300000)

**\*What are the causes of blindness in Yemen?** سؤال اختبار

## **Cataract, Refractive error, Corneal opacity, Childhood blindness, Glaucoma, Diabetic retinopathy and Trauma.**

-Doctor and assistant when receiving patients in the primary health unit with for example malnutrition they must to know how to give him the appropriate treatment as oral rehydration therapy, and they are responsible for giving the immunization against the 6 killer diseases (measles, tetanus, whooping cough, polio and diphtheria ).

### **\*What are the elements of the primary health care units?**

1. Health education. الدكتور ذكر مثال مكافحة الملاريا بردم المستنقعات ووضع زيت على سطح الماء والتوعية تكون عن طريق القاده
  2. Maternal & child health
  3. Water & sanitation. Because diseases transmitted by mosquitos and flies as Trachoma so good sanitation is the main health education in districts and community.
  4. Food & nutrition.
  5. Immunization. One of the most important preventive medicine.
  6. Control of locally endemic diseases. To decrease the incidence and prevalence of the diseases.
  7. Treatment of common diseases.
  8. Essential drugs. For DM, HTN, epilepsy must be available in the 1ry health care units.
- **Primary level:- cover 50000 of the population. Workers are (community based study→ preventive medicine)**

### **The 1ry health workers are responsible for:-**

1. Education in 1ry health care
2. Giving vaccines against the infectious diseases.
3. Able to diagnose malnutrition, vit A deficiency, trachoma, cataract, ect..

4. The health worker should know the early signs of vit A deficiency, trachoma.
5. He's responsible for the drugs distribution to the endemic areas.

**\*Primary eye care strategies within PHC:-**

Health promotion, information, education and communication.

Target groups are:-

- Teachers and community leaders.
- Traditional medicine practitioner. They must be educated especially in our country. Traditional medicine should not be used.

**\*Childhood blindness according to the eye care units:-**

1. Clean the eyes after birth and application of antibiotics. one of the preventive medicine for Neisseria gonorrhea and ophthalmia neonatorum.
2. Give mother vit A if she lives in endemic area to prevent vit A deficiency.
3. Promoting breast feeding. For immunity most common from malnutrition and Gastroenteritis.
4. Immunization against the 6 killer disease if the child in endemic area we give measles vaccine with one dose of vit A 100000 IU.
5. Keep children's face clean. One of the most common distribution of the disease is the flies for example trachoma transmitted from one patient to another.
6. Any child who can't see well he should be referred to the 2ry level.



7. Any child with white pupil or abnormalities should be referred to 2ry level.
8. Any child with serious eye injury or red eye also should be referred to 2ry level.
9. Don't put traditional medication to the eye. For example corneal tear he shouldn't put potato on his eye he should receive antibiotics, clean his eye and put patches. We should tell him to use the AB and go to the ophthalmologist in the 2ry level.

**\*Role of the PHC physician:-**

- Able to diagnose the common blinding disease in the community.
- Initial and early treatment of common eye disease.
- Timely referral eye disease and injuries.
- Take part in health education activities.
- Motivation for lid and cataract surgery.

**\*Role of the PHC nurse:-**

the assistant (nurse) is responsible for drugs distribution to the districts and rural area, health education programs and giving the vaccines.

- Recognition of common eye problem.
- Recording of vision of patients.
- Take part in health education activities.
- Teach patients how to apply eye medications.
- Able to perform emergency wash. For example if patient come with acidic burn the nurse must know how to wash his eye and do the first aid before the reference to the 2ry level.

-The idea of PHC activities in brief is either one of the following:-

1. Recognition and treatment. see the patient and treat him
  2. Recognition, treatment and referral. See the patient, treat him and refer him for further management.
  3. Recognition and referral. See the patient but can't treat him in the PHC unit so refer him for treatment.
- **Secondary Level:-cover 500000 of the population the workers are (hospital based study→ curative medicine)**

According to the WHO there must be an ophthalmologist, ophthalmic assistant and operation room for surgical interference.

The target of the 2ry level is feedback from the 1ry level. For example if there are 10 PHC units in different villages, the disease that present in one village the feedback goes to the 2ry level then the 2ry level practice the preventive medicine in the districts if this doesn't work reference to the tertiary level occur, then the tertiary level does the statistics about this disease, what is it and what are the appropriate drugs.

So 2ry level is sum of medical treatment interference and health education programs to the health workers, teachers, and families to detect the signs of the disease.

- **Tertiary Level:- teaching and research hospitals , cover 5 million of the population.**

**It's mainly teaching to the medical stuff and paramedics, and it's the guidance who control the 1ry & 2ry levels.**

If we have a disease in the 1ry level it will go to the 2ry level then to the tertiary level to do for example research about trachoma in AlMahweet this research will tell us about the incidence of the

disease and how we made a plan to decrease the incidence so the tertiary level is responsible for organization.

- **Center of excellence (COE):-** cover 20 million of the population.

There are 12 sub specialties in ophthalmology.

- **Common eye diseases in Yemen:-**

**1- Cataract:-** curable blindness



**What's cataract?** It's opacity of the lens or its capsule.

The commonest type of the blindness is the senile cataract.

**What are the types of senile cataract?**

1. Cortical
2. Nuclear
3. Subcapsular

**What are the types of congenital cataract?**

1. Anterior polar
2. Posterior polar
3. Lamellar

4. Blue dot cataract
5. Coronary cataract
6. Sutural cataract
7. Total cataract

**Traumatic cataract:-**

Rosette shaped cataract (pathognomic sign) or star shaped cataract

**What is the type of cataract in Wilson's disease?**

Sun flower cataract (pathognomic sign)

**What are the treatment of cataract in general?**

Cataract surgery.

**What types of surgery?**

ECCE or ICCE or lensectomy or phacoemulsification.

After we remove the lens it's called aphakia after we insert IOL it's called pseudophakia.

**What's the power of the crystalline lens? مهمه جداً الأرقام في اختبار الاورال**

**18 D**

**Cornea 42 D**

**Eye 60 D**

**Anteroposterior diameter of the eye = 24 ml**

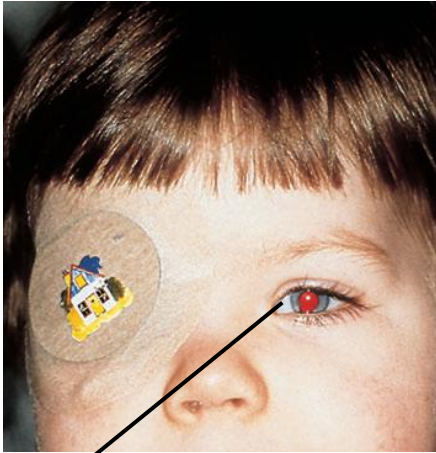
**Eye power in myopia =  $>60$**

**Eye power in hypermetropia =  $<60$**

**AP diameter in myopia =  $>24$**

**AP diameter in hypermetropia =  $<23$**

**What's an amblyopia?** it's a functional loss of vision without organic cause and with a normal eye findings. When examine the patient his eye is normal except for decrease in the vision



Amblyopic eye.

**What type of glasses used? Plus lens magnified lens**



**Errors of refraction:-**

People with large glasses if they don't wear it they are handicap.

**What's Trachoma?**

**It's a chronic communicable disease affecting the epithelial layer of the conjunctiva and cornea caused by chlamydia trachomatis.**

**سؤال اختبار** What's the WHO classifications?

**FISTO classification or MacCallen's classification (old)  
FISTO**

- 1. Follicular stage**
- 2. Intense stage**
- 3. Scarring stage**
- 4. Trichiasis stage**
- 5. Opacity stage**

**مهم جداً سؤال اورال** What's the cause of blindness in trachoma?

**Corneal opacity**

**Trachoma transmitted by flies if we control it we'll decrease the incidence of the disease by good sanitation and cleaning of the face.**

**\*Prevalence of trachoma:-**

- 590 million in the world at risk of blinding trachoma.
- 150 million have active trachoma(means trachoma intense, trachoma follicle but scarring is inactive trachoma)
- 10.6 million have trichiasis
- 6 million have irreversible blindness caused by trachoma



### **Trachoma follicles**

**We count them in the area of the circle (pathognomonic) not in the periphery because the normal follicles present there.**

**Form 5 or less → trachoma follicles.**

**>5 → trachoma intense.**

### **What's follicles?**

Histologically increase the adenoid aggregation tissue

In the conjunctiva we have adenoid layer

### **What's the adenoid layer?**

Normal presentation of lymphocyte in this area come from the periphery to aggregate.

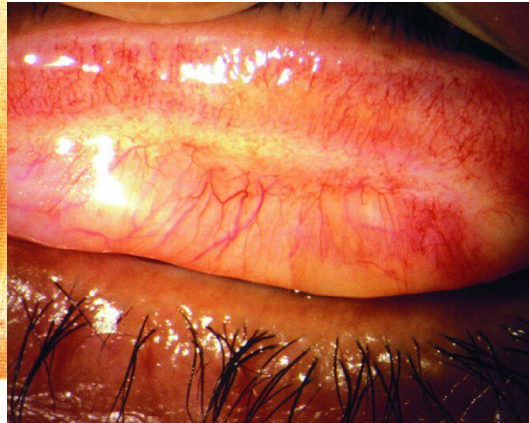
So follicles are lymphocytic aggregations increase with the disease when it gets bigger it's called follicles.

-Follicles indicating a chronic inflammatory process

-Chronic inflammatory process response against lymphocyte whatever it's a T lymphocyte or B lymphocyte.



*Trachomatous scarring (TS)*



Long standing inflammatory process mainly in the sulcus sub tarsalis → the most common site of the inflammatory process in trachoma

- **Any chronic inflammatory process will be associated with fibrous tissue formation and this give the pathognomic sign which is the Arlet's line (whitish area in the sulcus sub tarsalis of the conjunctiva)**
- **In exam they focus on follicle, Arlet's line and corneal opacity pictures to ask you about trachoma.**
- Active trachoma (intense & follicles) in the age of the first 7 years of life, if we control it from the beginning it'll prevent the blindness in elderly
- Trachoma scarring (inactive) after the age of 40

So blindness in trachoma occur after the age of 40 but infection in the first 10 years of life.

### **\*Complications:-**

Scarring will damage the conjunctiva → damage to the accessory lacrimal glands, goblet cells and tear film that present in the conjunctiva → leads to some degree of dryness.



### **\*Trachoma control:-**

**SAFE strategy:- very important in oral exam or (MCQ:-all the followings are correct about the SAFE strategy except )**

1. **S**urgery→ will correct the trichiasis to prevent corneal opacity
2. **A**ntibiotics treatment of active trachoma (azithromycin )
3. **F**acial cleaning
4. **E**nvironmental changes→good sanitation

### **\*Vitamin A deficiency:-**

**What are the functions of vit A?**

1. Regeneration of the epithelial cells in the skin and mucus membrane→its turnover is faster than of the skin so epithelization occur faster.
2. Formation of the rhodopsin→responsible for night vision it's called scotopic vision.

Most susceptible patients to vit A deficiency are children below the age of 5 years due to repeated gastroenteritis and malnutrition. Patient with vit A deficiency will get blind signs in childhood while in trachoma blindness occur in the age of 40 and above.

-Vit A causes irreversible blindness if not prevented and treated well.

- If we give one dose of vit A we prevent blindness for about 6 months to 1 year so there must be a routine vit A distribution in endemic area.

### **\*What are the sources of vit A ?**

1. Carrots
2. Any green vegetable contain vit A

- Don't give vit A for those who don't have signs of vit A deficiency (malnutrition, endemic area), excessive intake will lead to hypervitaminosis leads to vit A precipitation because the body has specific requirement.
- The parents give history about the problem يجوا الاهل يشتكوا ان الطفل يقلد الاشياء في الليل ممكن يدعس اي شي لانه مش قادر يشوف
- The main symptom is night blindness (nyctalopia) due to → deficiency of the rhodopsin in the rods.

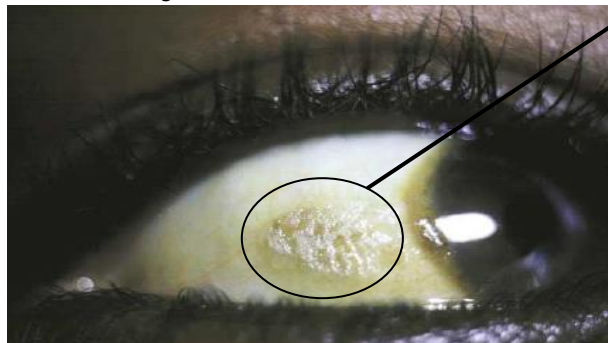
### **Vitamin A deficiency signs:- مهم جداً للاختبار**

#### **❖ Primary signs:-**

X means → xerophthalmia → dryness of the eye 2ry to vit A deficiency.

A & B all in conjunctiva → it's an epithelial layer so if there is vit A deficiency the turnover will be slow → no epithelization → dryness 2ry to the damage of goblet cells and the accessory lacrimal glands → dryness will lead to keratinization of the epithelial layer of the conjunctiva it's called **Bitot's spot** (X1B) (pathognomic sign and it will be persist for long time after treatment)

1. X1A Conjunctival xerosis
2. X1B conjunctival xerosis + Bitot's spots (مهمه للاختبار)



3. X2 corneal xerosis
4. X3A corneal xerosis + corneal ulceration
5. X3b keratomalacia.

**From 1 to 4 (X1A to X3A)→if we treated the patient the blindness is reversible and after giving him vit A →dramatic improvement**

**But if he reach the stage of keratomalacia it's irreversible.**

### **What's keratomalacia?**

It's a persistence of vit A deficiency untreated → corneal stroma secret collagenase enzyme→lysis of cornea and melting → the remaining are endothelial layer and descemments membrane because the epithelium has been lost in the beginning of the disease and the stroma destructed by the collagenase enzyme.

**-How we know if the Bitot's spot indicate active disease or not?**

If the patient come with the 1ry and 2ry signs →active

But if he come with good vision, no night blindness and old age →indicates that he has an attack in the past.

-vit A deficiency means that there isn't tear film because the accessory lacrimal glands and goblet cells will be affected by the dryness of the conjunctiva by damage the epithelium so→ deficiency of tear film (Its function is to wash the debris from the eye, any accumulations from the turnover of the cells washed by tear film ) →dead tissue must be washed by tear film but here there is deficiency in the tear film so it'll lead to the persistence of dead tissue in the conjunctiva and cornea→ stained by the Rose Bengal stain(stain the dead tissue).

### **❖ Secondary signs:-**

- 1. XN night blindness**
- 2. XF xerophthalmic fundus**

### 3. XS xerophthalmia scars



#### **What's the treatment of vit A deficiency?**

In endemic area any patient come to the PHC unit for any purpose give him vit A → prevent the disease for 6 months because it precipitate in the body and absorbed according to the need.

#### **❖ If more than 1 year of age:-**

3 doses:-

1. 200000 IU first day orally
2. 200000 IU second day orally
3. 200000 IU one month later orally

#### **❖ If less than 1 year of age:-**

3 doses:-

1. 100000 IU first day orally
2. 100000 IU second day orally
3. 100000 IU one month later orally

❖ If the patient has malnutrition can't take the vit A (fat soluble )orally if the patient has fat

malabsorption → vit A parenteral (half the dose of the oral)

**\*Onchocerciasis (river blindness):-**

Present in the river areas (Fast River)

- Main host → human
- Intermediate host → blackfly (simulium damnosum).

In Yemen it doesn't cause blindness there is another species which cause blindness in Africa in Sub-Saharan area → 90% will be blind.

- Onchocerciasis 99% of those infected live in Sub-Saharan Africa.
- 18 million persons infected.
- 80 million exposed to infection.

❖ Life cycle :-

The blackfly take microfilaria from infected person → microfilaria enter the cycle of the blackfly developed into larva (infective) → go to infect another person. بقية المعلومات موجوده في الشريحة رقم 55 الدكتور قرأها سريع بدون اي اضافات

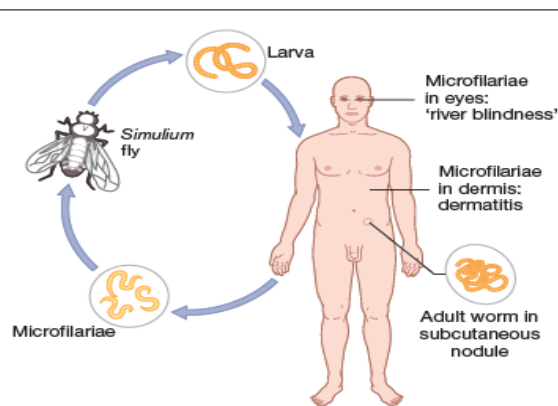


Fig. 11.31 Life cycle of *Onchocerca volvulus*

-Easy to diagnosed→ microfilaria which secret by the adult worm (secret millions) skip from the fibrous tissue→blood stream and fluid areas in the body, if you take specimen from any part of the body you're gonna find microfilaria(sputum, tear film, feces, urine, vaginal secretions, CSF and blood stream )even in the AC, cornea, lens, vitreous and retina.

- When microfilaria died it cause severe allergic reaction

- It occur in the eye in optic nerve (cause optic neuritis), retina (chorio-retinitis), cornea (cause sclerosing keratitis→corneal opacity) and uveal tissue.

#### ❖ Investigations:-

The nodule →histopathology →adult worm

#### ❖ Clinical presentations:-

1. Sever itching in the skin due to allergic reaction it's called **Leopard's skin**



### ❖ Prevention and management:-

Vector control:- الى حد الان لم يستطيعوا التخلص منها (تطير في الهواء بسرعة 60 ميل)

In the past trachoma was treated along the whole year but when they start to use azithromycin only one dose every 6 months, but in onchocerciasis the treatment was introduced in the ICU they were giving AB to attack the microfilaria then after it died it release millions of microfilaria which cause severe allergic reaction (lifethretining condition)

### ❖ Treatment:-

Ivermectin → it's AB

-Action:- similar to the contraceptive pills → sterilization of the female uterus → death of the microfilaria in the female uterus so decrease the reaction

-Adult worm lives for 10 years so treatment must be continued for 10 years every 6 months he must take one dose and those in the periphery we must get rid of them.

-Dose:- 150 micron / kg.

هذا تفرغ لكلام الدكتور كامل بدون اي اختصارات والعفو اذا في اخطاء

^^ موفقين